Upper Columbia River RI/FS

EPA & Principals Technical Meeting: White Sturgeon Issues and Concerns

November 29, 2006
9 a.m. to 3:30 p.m.

Hosted by WDOE – 4601 N. Monroe, Spokane, WA

Meeting Notes

Meeting Objective: Identify and discuss issues associated with white sturgeon contaminant exposure in the Upper Columbia River (Lake Roosevelt) in context of Risk Assessment and future decision making/activities.

Attendees:

John Roland/Ecology – Mtg Host
Bruce Duncan/EPA – Mtg Lead
David Charters/EPA
Sally Thomas/EPA
Burt Shephard/EPA
Kevin Rochlin/EPA
Brendan Dowling/Ecology
Dan Audet/DOI
Richard Henry/USFWS
Jim Hansen/USFWS
Patti Bailey/CCT
Sheri Sears/CCT
Deanne Pavlik-Kunkel/STI
Fred Kirschner/STI Consultant
Pamela Bridgen/EI
Chris Thompson/EI
John Walen/WDFW
Jason McLellan/WDFW
Alec Maule/USGS
Mike Parsley/USGS
Eugene Greer/USGS
Patrick Moran/USGS
Forrest Olson/CH2M HILL (note taker)
Jim Stefanoff/CH2M HILL (note taker)

EPA Summary:

In general, most suggestions relating to the ERA (and the determination of risk from contaminant release) focused on toxicity testing with larval sturgeon using sediments from the UCR, with initial focus on the area from Evans to the Canadian border. A variety of possible endpoints were mentioned (e.g., mortality and effects on development and growth). Other concerns included the role of adult body burden on eggs, physical effects of slag on eggs and larvae, and the role of diet in sturgeon exposure as well as what could be learned from studying older sturgeon. Discussion of CSM components relative to the spawning area identified three successively expanding areas where different life stages may be potentially exposed. Some initial thoughts on practical sampling issues were made and attendees suggested information sources that could be valuable to this topic.

The meeting focused on issues, concerns, and suggestions. Distinction between these often was blurred during discussions, and the listed items below reflect that. Also, some topics were identified more than once, often in different context. The lists below reflect minimal editing from the items as captured during the meeting.

Notes:

1. Attendees Round Table: What are Issues/Concerns/Objectives - related to RI/FS

- Need a study to determine if sturgeon are at risk
- Understand relationship between newly hatched sturgeon and sediment exposure (contaminated or not)
- Ascertain damage
- Understand physiological impacts on sturgeon that affect survival and the population
- Risk Assessment/damage assessment, and recovery
- Spokane Tribe looking toward recovery and interest in being able to again consume sturgeon
- EPA's objective is to complete an RI/FS and the ultimate goal is a clean-up decision
- Like to see a coordinated team to assist and direct a sturgeon technical team
- Desire to understand how everyone (stakeholders) will work together.
- TRV utility - Toxicity Reference Value
- Understand lack of sturgeon recruitment and possible link to contaminants
- Identify and understand how data gaps relate to RI/FS
- Where and how to target sampling
- Focus on ERA but also on the utility of evaluating sturgeon

Broad Focus Issues/Needs

- Damage Assessment
- Sturgeon population recovery and human consumption health risk
- Special Status Species
- Individual fish basis
- Tease out contaminants from other possible stressors
- Teck Cominco focus:
  - Teck Cominco and B.C. Ministry of Environment focusing on slag.
  - Teck Cominco has brought up issue/concern of contaminant effects of fire retardants

2. Jason McLellan - Presentation on Lake Roosevelt Sturgeon Research

- Demographic changes to older fish (1981-1986 & 1997-1998; B.C. studies)
- Recruitment began to decline in the mid-1970's
- CAN population and Lake Roosevelt population may be different
- Upper Columbia River White Sturgeon Recovery Initiative (UCWSRI) formed in 2000. Recovery Plan prepared in 2002

- Fishing closed in Lake Roosevelt in 2000, closed in Canada in 1996
- Sturgeon Recovery Plan funded by BPA in 2002 and started in 2003. (STOI, CCT, and WDFW)
- Stock Status studies in 2004, Findings:
  - Juveniles - captured by gill nets
  - Adults -captured by set lines
  - 95% of white sturgeon are collected in upper half of reservoir above Gifford.
  - Most of the catch is in Marcus Flats area
  - Marcus Flats is at the major river/reservoir interface
  - Observed some successful recruitment in mid-to-late 1990's
  - Broodstock abundance (total per reservoir) ≥ than in mid-Columbia impoundments
  - Gill net catch (mostly hatchery fish) of juveniles almost all at or above Kettle Falls
  - Most adults over-winter at Marcus Flats based on acoustic tagging results.
  - Current Population Abundance:
    - All sizes : 2, 037
    - < 110 cm: 168
    - 110 - 166 cm: 420
    - >167 cm: 1449
    - 95% CI for total: 1,093
- Jason McLellan opines that there are fewer sturgeon in the lower lake because of less benthos, deeper water. Other fish species there are mostly pelagic feeders
- Marcus Flats over-wintering area - most sturgeon are found in the old river channel. Jim Stefanoff noted that this is where most of the slag is located based on 2005 sampling
- Recent telemetry studies found a spawning site right at Northport (US) - earlier evidence found spawning only at Waneta tailrace (CAN)
- Early fry disperse for ~1 week. Then as yolk-sac fry, go into the substrate for cover
- A fair amount of recruitment of early fry at and below Northport
- Bottleneck between exogenous feeding and age-1 fish
- Stomach analysis of 40 age-1 and age-2 fish found that none had black sand in stomach
- There are at least 9 hypotheses as to why there appears to be a bottleneck -Jason hopes to post his presentation on website
- Audience comment: - many possible stressors (9) but contaminants may be the straw breaking camel's back
- UCWSRI Recruitment Failure Workshop planned for this winter to develop study priorities on issues.
- UCWSRI website: www.uppercolumbiasturgeon.org

3. Round Table - What current research is being done, or needed, related to evaluating sturgeon in the ERA

Needed for the ERA: The comments centered on a basic theme of toxicity tests involving early life stages. Other comments suggested sampling food, body burdens and eggs to look at exposure or feeding studies to look at effects:

- Early life stage toxicity tests
- Feeding studies for juvenile sturgeon
- Contaminant in eggs vs. tissue on same fish (brood stock?)

- Put eggs into slag and see the effects on development
- Diet of juveniles
- Slag impact - physical and contaminant
- Field tissue sampling of adults
- Acute and chronic toxicity testing
- Molly Webb (FWS in Bozeman) developing non-lethal tissue, blood and, liver sampling
- Tissue plugs: need 4 to 6 grams
- Gonadal tissue

Other work needed to understand sturgeon in the system included:

- Invertebrate sampling
- Resource limitation - habitat limitation and bottlenecks
- Body burden - in adult passed on to juveniles, effects on feeding behavior
- Ongoing work mentioned included:
- Side-scan substrate mapping (Evans to border) - STOI and WDFW to do next year
- WDFW/STOI 2007 invertebrate and substrate sampling plan
- WDFW to expand larval sampling, more in shallow water to see where the larvae are
- Look at lower reservoir more

4. Ecological Risk Assessment - What is Needed?

- More telemetry studies
- Early lifestage testing
  - Start acute tests, refine COC, then chronic
  - Sediment from reservoir
  - Aquatic invertebrates (food web is a missing element)
  - Field/lab testing hypothesis
- Body burden - (material effects on eggs)
  - Adults: tissue plugs, blood, gonadal tissue, liver biopsy, egg/plug
  - Subadults/adults: subsistence, bioaccumulation
- Substrate mapping related to:
  - Invertebrates
  - Larval diet and egg collection
- Larval anomalies
- Physical/other effects of sediments
- Resources limitation, dietary toxicology
- Expand sampling to random sampling, duplicates (lower portions)
- Lab studies of egg/larvae-slag physical effects
- Predation on and diet of younger fish
- Physical effects - larvae in interstitial spaces
- Field tissue sampling, diet, lesions/diseases
- Fish feeding on invertebrates raised on slag - pertaining to growth/survival

5. Conceptual Site Model: What would you evaluate and where? What practical sampling issues do you see involved?

- Re-assess the 6 areas sampled for tissue contamination in 2006: Why were the 6 areas chosen and how do they apply to sturgeon?
- Use what we know to decide where to sample
- 4-6-8 week chronic – flow-through and field, slag (Waneta/Tech), diet, combined, plus video behavior.
- Lab studies – field sediment (slag to native (Evans to border))
- Dietary studies on missing lifestage
- Tissue concentrations – free embryos and larvae
- Focus on Evans to the border
- Exogenous feeding – food quantity/quality
- Benthic community – compare the relationships to life cycle feeding
- Early larvae – study in lab. In slag and w/o slag sediment
- Understand/evaluate old sturgeon
- Bioaccumulation vs. age. For the whole area
- Hatchery – wild inferences – tissue sampling
- Incremental risk attributable to release of contaminants
- How do the fish concentrate contaminants
- Development and growth rates affected by contaminants (egg, larvae, etc..)
- Bioavailability – slag, sediment (colloidal metals)
- In-situ sturgeon raise for missing age group, is it predation? Do we need a more sensitive fish?
- Bottleneck location (age/fish)
- Contaminant concentrations in prey
- Invertebrates (feeding) – development and growth effects from contaminants
- Tag hatchery fish (2 years – 10 year tags), monitor exposure
- What do large fish forage on? Stable isotope?
- Field/lab studies on foraging – Spatially explicit potential growth models (sediment, invertebrates)
- 3 successively expanding areas identified radiating out (mostly downstream) from the spawning area above Marcus Flats. The first area extends from the U.S.-Canada border downstream to about river mile (RM) 711 which is just above Marcus Flats. This area has higher water velocities sufficient to transport sand as bed load and a cobble/gravel/sand riverbed. The second area extends through Marcus Flats and is a transition zone between the more upstream riverine and the downstream lacustrine water conditions. A large amount of slag and sand has accumulated in the thalweg in this area. The third area extends to the dam and is lacustrine with low water velocity and a reservoir bottom consisting of silts/clays/and colloids, with the finer sizes increasing in percentage towards the dam.

6. Sturgeon Investigations – Practical Issues

- Fishery is closed – by state and co-managers (tribes)

- Non-lethal tissue plugs, blood, liver, gonads
- Lethal sampling– permissions, sample size
- Temporal windows
- Surplus hatchery eggs, larvae (June/July) - see Jason, need permit, start process in May
- Tissue residue retention values (correlate with subparts, lipids, etc.)
- Inventory of information sources

7. Materials that may be useful to attendees:

- Tech Cominco fire retardant information
- Jason McClellan's presentation
- Upper Columbia River White Sturgeon Initiative website: www.uppercolumbiasturgeon.org
- Information on upcoming sturgeon workshop (Feb 20) by the Transboundary Contaminants Working Group
- Dwyer publication on water effects ratio (WER) -attached
- Egg incubation substrate suitability information
- Deanne Pavlik-Kunkel's Sturgeon Study Plans (BPA) – several months out.